Unit 2A Review: Transformations & Triangle Congruence
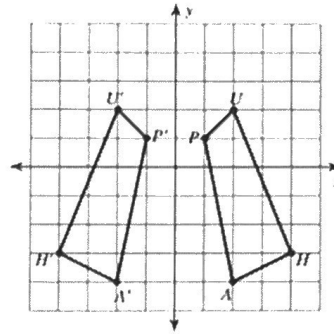
Learning Target #1: Rigid Transformations

Multiple Choice: Determine the rule described in the transformations below.

1. Which transformation has occurred to quadrilateral AHUP?

   a. *rotated 90°*

   b. *reflected across x − axis*

   c. *rotated 180°*

   d. *reflected across y − axis*

   $$P(1,1) \rightarrow P'(-1,1)$$
   $$(x,y) \qquad (-x,y)$$

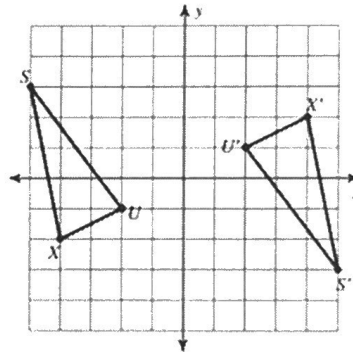2. Which transformation has occurred to triangle UXS?

   a. *rotated 90°*

   b. *reflected across x − axis*

   c. *rotated 180°*

   d. *reflected across y − axis*

   $$S(-5,3) \rightarrow S'(5,-3)$$
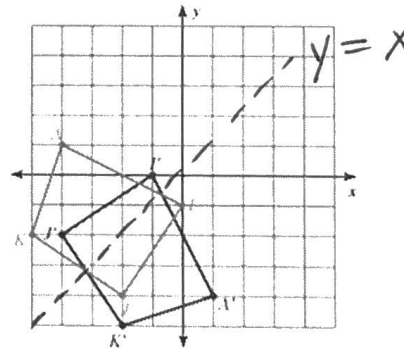 $$x \quad y \rightarrow (-x,-y)$$

3. Which transformation has occurred to quadrilateral AKJI?

   a. *reflected across y = x*

   b. *rotated 270°*

   c. *reflected across x − axis*

   d. *rotated 360°*

   $$A(-4,1) \rightarrow A'(1,-4)$$
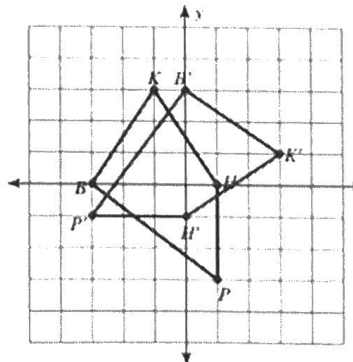 $$(x,y) \longrightarrow (y,x)$$

   $y = x$

4. Which transformation has occurred to quadrilateral BKHP?

   a. *reflected across y = x*

   b. *rotated 270° CCW*

   c. *reflected across x − axis*

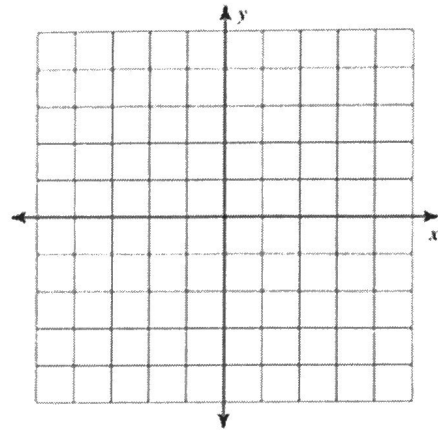   d. *rotated 360°*

   $$K(-1,3) \rightarrow K'(3,1)$$
   $$(x,y) \longrightarrow (y,-x)$$

Find the coordinates of the vertices of each figure after the transformations. Use the graph below as a visual to help.

5. What would be the vertices of the image if the pre-image had vertices $A(2,-2), B(1,2), C(3,3), D(5,2)$ and they were rotated 180° CW about the origin?

$(x, y) \rightarrow (-x, -y)$

   a. $A'(2,-2), B'(-1,2), C'(-3,3), D'(-5,2)$

   b. $A'(-2,2), B'(-1,-2), C'(-3,-3), D'(-5,-2)$ ⟵ (circled)

   c. $A'(-2,-2), B'(2,-1), C'(3,-3), D'(2,-5)$

   d. $A'(2,-2), B'(2,1), C'(3,-3), D'(2,5)$

6. What would be the vertices of the image if the pre-image had vertices $A(2,-2), B(1,2), C(3,3), D(5,2)$ and they were reflected across the x-axis? $(x, y) \rightarrow (x, -y)$

   a. $A'(2,-2), B'(-1,2), C'(-3,3), D'(-5,2)$

   b. $A'(-2,2), B'(-1,-2), C'(-3,-3), D'(-5,-2\,2)$

   c. $A'(-2,-2), B'(-1,-2), C'(-3,-3), D'(-5,2)$

   d. $A'(2,2), B'(1,-2), C'(3,-3), D'(5,-2)$ ⟵ (circled)

7. What would be the vertices of the image if the pre-image had vertices $A(2,-2), B(1,2), C(3,3), D(5,2)$ and they were rotated 270° CCW about the origin? 90° CW $(x, y) \rightarrow (y, -x)$

   a. $A'(2,-2), B'(-1,2), C'(-3,3), D'(-5,2)$

   b. $A'(-2,2), B'(-1,-2), C'(-3,-3), D'(-5,-2)$

   c. $A'(-2,-2), B'(2,-1), C'(3,-3), D'(2,-5)$

   d. $A'(2,-2), B'(2,1), C'(3,-3), D'(2,5)$

8. On the graph to the right draw and label the triangle with vertices $A(-4,5), B(-3,2), C(-1,4)$ after all of the transformations listed below are done. <u>DRAW all the images.</u>

   i.   *Translated 2 unit right and 2 units down*
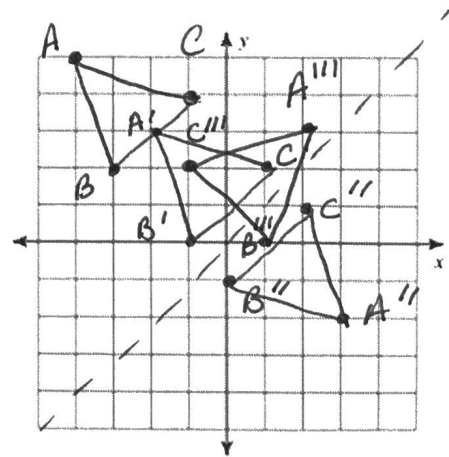
      A' $(-2,3)$ B' $(-1,0)$ C' $(1,2)$

   ii. *Reflect across $y = x$* (y, x)

      A" $(3,-2)$ B" $(0,-1)$ C" $(2,1)$
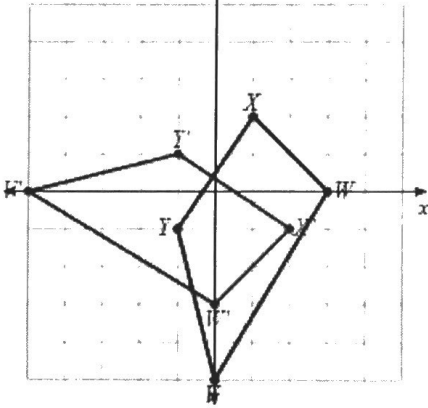
   iii. *Rotate 90 degrees CCW about the origin* $(-y, x)$
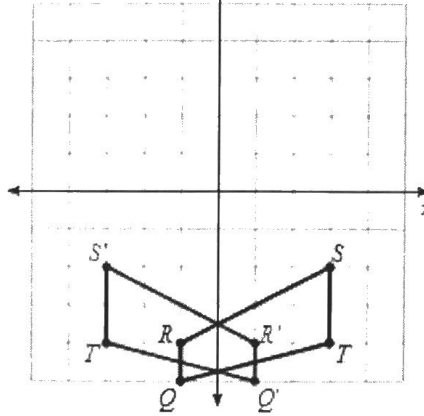
      A''' $(2,3)$ B''' $(1,0)$ C''' $(-1, +2)$

9. Name the ordered pair rule that transforms each figure into its image.
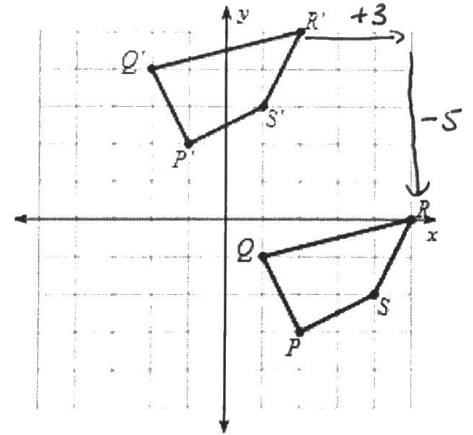
Rule: (x, y) → $(y, -x)$
$X(1,2) → X'(2,-1)$


Rule: (x, y) → $(-x, y)$
$S(3,-2) → S'(-3,-2)$

Rule: (x, y) → $(x+3, y-5)$

+3

-5

10. Which sequence of transformations maps $\triangle ABC$ to $\triangle RST$?

A. Reflect $\triangle ABC$ across the line x = -1. Then translate the result 1 unit down.

B. Reflect $\triangle ABC$ across the line x = -1. Then translate the result 5 units down.

C. Translate $\triangle ABC$ 6 units to the right. Then rotate the result 90° clockwise about the point (1,1).

D. Translate $\triangle ABC$ 6 units to the right. Then rotate the result 90° counter-clockwise about the point (1,1).
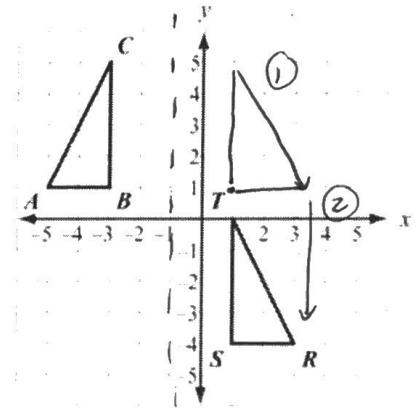
11. Describe the sequences required for the following transformation below:
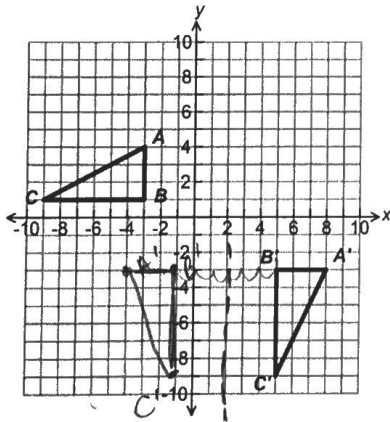
1. 90° CCW $(-y, x)$

2. Reflect over x = 2

$A(-3,4) → (-4,-3) → (8,-3)$
$B(-3,1) → (-1,-3) → (5,-3)$
$C(-9,1) → (-1,-9) → (5,-9)$

12. Quadrilateral ABCD is rotated 90° counterclockwise (or 270 clockwise) about the origin. Name the new coordinates. $(x, y) \rightarrow (-y, x)$

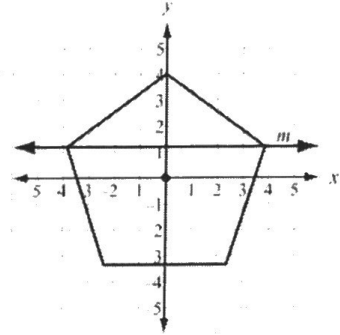| Original Coordinates	A (1, 3)	B (3, 4)	C (6, 5)	D (1, 5)
New Coordinates	A' (-3, 1)	B' (-4, 3)	C' (-5, 6)	D' (-5, 1)

13. A regular pentagon is centered about the origin and has a vertex at (0,4).
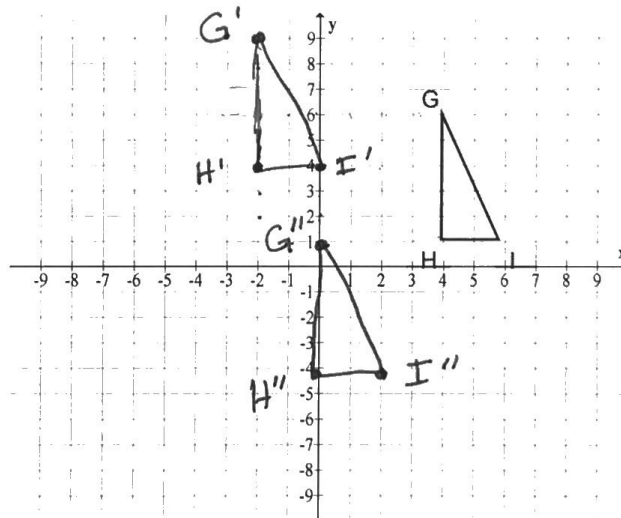
Which transformation maps the pentagon to itself?

A. a reflection across line m

B. A reflection across the x-axis.

C. A clockwise rotation of 100° about the origin

(D) A clockwise rotation of 144° about the origin

$\frac{360}{5} = 72°$

$72 \times 2 = 144°$

14. Translate the triangle GHI with the vector <-6, 3>, then translate it with the vector <2, -8>.
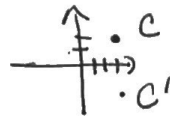
1. $(x-6, y+3)$

2. $(x+2, y-8)$

Name the Vertices of the image: G" (0, 1) H" (0, -4) I" (2, -4)
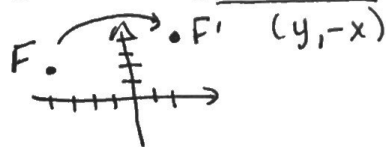
Name a single translation vector that could get from GHI to G"H"I" : $(x-4, y-5)$

15. Point C is located at (3,2), after reflecting the point over the x-axis, which quadrant will the image of point C be located in?

4th quadrant

16. Point F is located at (- 4, 2), after rotating 90° clockwise about the origin, which quadrant will the image of F be located in?

$(y, -x)$

1st quadrant

Test Review 4 | 6

Learning Target #2: Congruent Triangles & Proofs

Complete each congruence statement by naming the corresponding angle or side.

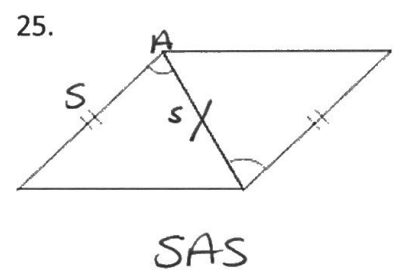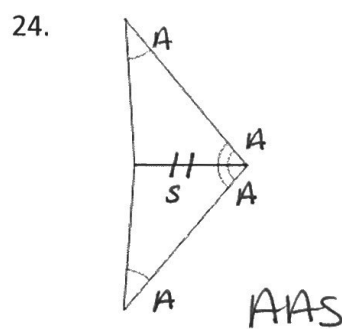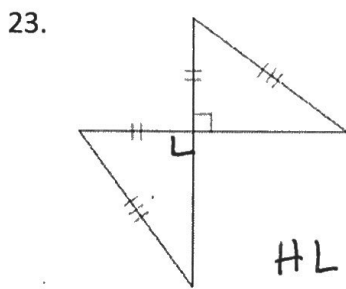17. $\triangle LKJ \cong \triangle LBC$

18. $\triangle V\underline{W}\underline{X} \cong \triangle VIJ$

19. $\triangle KL\overset{\bullet}{M} \cong \triangle LK\overset{\bullet}{C}$

$\angle JLK \cong \underline{\angle CLB}$

$\overline{WX} \cong \underline{\overrightarrow{IJ}}$

$\angle M \cong \underline{\angle C}$

State if the two triangles are congruent. If they are, state how you know.

20.

SAS $\neq$ ASS
not $\cong$

21.

HL

22.

ASA

23.

HL

24.

AAS

25.

SAS
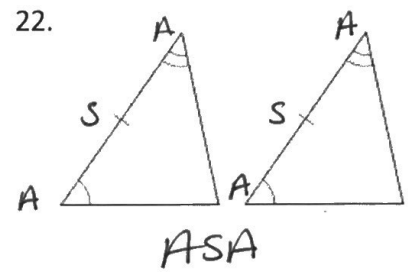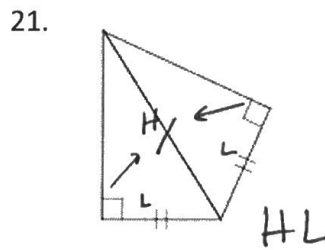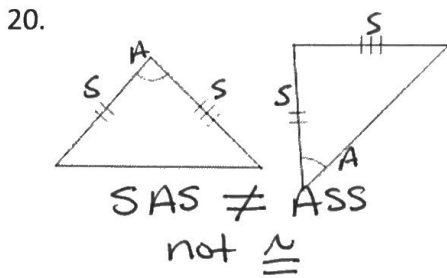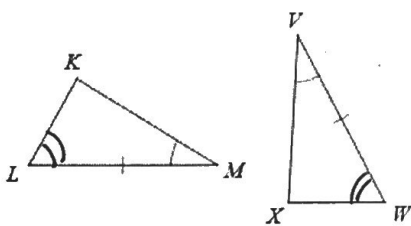
State what <u>additional</u> <u>information</u> is required in order to know that the triangles are congruent for the reason given.
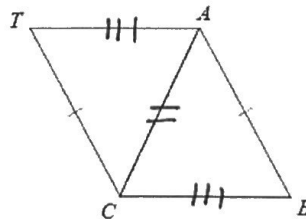
26. ASA

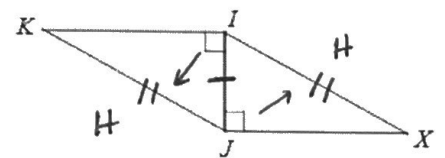$\angle L \cong \angle W$

27. SSS

$\overline{CA} \cong \overline{CA}$
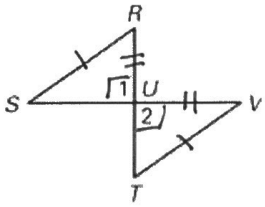$\overline{CB} \cong \overline{TA}$

28. HL

$\overline{IJ} \cong \overline{IJ}$
$\overline{KI} \cong \overline{IX}$

Complete the proofs. 29. – 31.

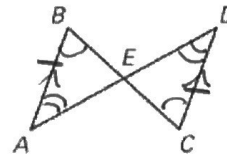Given: $\overline{RT} \perp \overline{SV}$, $\overline{RS} \cong \overline{TV}$, $\overline{RU} \cong \overline{TU}$

Prove: $\triangle RUS \cong \triangle TUV$

Statements	Reasons
1. $\overline{RT} \perp \overline{SV}$, $\overline{RS} \cong \overline{TV}$, $\overline{RU} \cong \overline{TU}$	1. Given
2. $\angle 1$ and $\angle 2$ are right angles.	2. Def. of $\perp$ lines
3. $\angle 1 \cong \angle 2$	3. Def. of Right $\angle$'s
4. $\triangle RUS \cong \triangle TUV$	4. HL

Given: $\overline{AB} \parallel \overline{DC}$, $\overline{AB} \cong \overline{DC}$
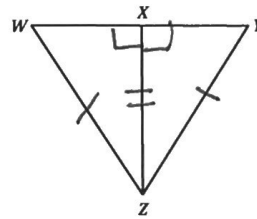
Prove: $\overline{AE} \cong \overline{DE}$

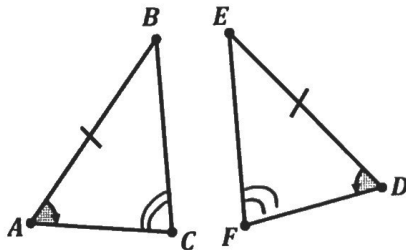| Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$	1. Given
2. $\angle ABE \cong \angle DCE$	2. Alt. Int. $\angle$'s Postulate
3. $\overline{AB} \cong \overline{DC}$	3. Given
4. $\angle BAE \cong \angle CDE$	4. Alt. Int $\angle$'s Post.
5. $\triangle AEB \cong \triangle DEC$	5. ASA
6. $\overline{AE} \cong \overline{DE}$	6. CPCTC

31. Given: $\angle WXZ$ and $\angle YXZ$ are right angles

$\overline{WZ} \cong \overline{YZ}$

Prove: $\angle W \cong \angle Y$

Statements	Reasons
1. $\angle WXZ$ and $\angle YXZ$ are Rt. $\angle$'s	1. Given
2. $\angle WXZ \cong \angle YXZ$	2. Def. of Right $\angle$'s
3. $\overline{WZ} \cong \overline{YZ}$	3. Given
4. $\overline{XZ} \cong \overline{XZ}$	4. Reflexive Prop
5. $\triangle WXZ \cong \triangle YXZ$	5. HL
6. $\angle W \cong \angle Y$	6. CPCTC

32. If $\triangle ABC \cong \triangle DEF$ by AAS, what additional piece of information needs to be marked?

$\angle C \cong \angle F$